4. (Amended) The apparatus of claim 1 having an effective operating temperature below about 300K.

Cont

A1

5. (Amended) The apparatus of claim 1, wherein said sensor includes at least two metallic electrodes.

A2

7. (Amended) The apparatus of claim 1 and further comprising a circuit electrically coupled to said sensing member operable to apply a time varying electric field to said sensing member.

A3

9. (Amended) The apparatus of claim 2, wherein said gradient is established by a number of differently composed layers.

10. (Amended) The apparatus of claim 1, wherein said sensing member is formed of $PbZr_xTi_yO_3$; where x is in a range of about 0.5 to about 0.8 and y is in a range of about 0.2 to about 0.5.

A4

15. (Amended) The apparatus of claim 1, wherein said sensing member is comprised of an oxygen deficient ionic oxide material.

A5

17. (Amended) A method of detecting oxygen in an intake or exhaust stream of a vehicle with the apparatus of claim 1.

18. (Amended) A method of manufacturing an oxygen sensing device, said method, comprising:

providing a source of ferroelectric material having a first region with a first composition and a second region with a second composition different from the first composition;

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irradiating a portion of the first region and a portion of the second region with a laser to release a mixture from the source with a predetermined ratio of the first composition to the second composition; and

forming a layer of a sensing matrix from the mixture, the mixture corresponding to the ratio.

22. (Amended) The method of claim 18 further comprising performing said irradiating of a number of different portions of the first and second regions to form a graded ferroelectric sensing member.

A7

23. (Amended) The method of claim 18, wherein said irradiating includes scanning a predetermined path along the source with the laser.

25. (Amended) The method of claim 18, wherein said forming includes depositing the mixture on a substrate.

26. (Amended) An oxygen sensor formed by the method of claim 18.

31. (Amended) The method of claim 27, wherein said generating the plumes includes irradiating a corresponding number of different portions of the first and second regions.

A8

32. (Amended) The method of claim 27, wherein said irradiating includes scanning across a predetermined path along the source with a laser.

A9

34. (Amended) The method of claim 27, wherein said forming includes depositing material from a first one of the plumes on a substrate.

Cont A9

35. (Amended) An oxygen sensor formed by the method of claim 27.

A10

41. (Amended) The apparatus of claim 36, wherein a ratio between two compositional constituents increases along a predetermined direction through said sensing member to provide a corresponding compositional gradient.

A

43. (Amended) The apparatus of claim 41, wherein said two compositional constituents are zirconia and titania.

44. (Amended) The apparatus of claim 36 wherein said sensing member is formed of $PbZr_xTi_yO_3$; wherein x is in a range of about 0.5 to about 0.8 and y is in a range of about 0.2 to about 0.5.

A11

46. (Amended) A method of detecting oxygen in an intake or exhaust stream of a vehicle with the apparatus of claim 36.

A12

49. (Amended) The combination of claim 47, wherein said peak magnitude is in a range of about 1 volt per μm to about 1000 volts per μm.

A13

51. (Amended) The combination of claim 47, wherein said sensing member is comprised of a ferroelectric material.

52. (Amended) The combination of claim 47, wherein said sensing member is comprised of a PZT material.

53. (Amended) The combination of claim 47, wherein the system is operable to detect oxygen concentration at a temperature below about 400K.

Please add new claims 54-71 as follows:

54. (Added) The apparatus of claim 2 having an effective operating temperature below about 375K.

55. (Added) The apparatus of claim 2 having an effective operating temperature below about 300K.

56. (Added) The apparatus of claim 2, wherein said sensor includes at least two metallic electrodes.

57. (Added) The apparatus of claim 2 and further comprising a circuit electrically coupled to said sensing member operable to apply a time varying electric field to said sensing member.

58. (Added) The apparatus of claim 2, wherein said at least two compositional constituents are zirconia and titania.

59. (Added) The apparatus of claim 8, wherein said gradient is established by a number of differently composed layers.

60. (Added) The apparatus of claim 2, wherein said sensing member is formed of $PbZr_xTi_yO_3$; where x is in a range of about 0.5 to about 0.8 and y is in a range of about 0.2 to about 0.5.

61. (Added) The apparatus of claim 60, wherein x increases along a direction through said sensing member and y decreases along said direction.

62. (Added) The apparatus of claim 61, wherein x is in a range of about 0.55 to about 0.75 and y is in a range of about 0.25 to about 0.45.

63. (Added) The apparatus of claim 60, wherein said sensing member includes a number of layers each having a different ratio of x to y.

64. (Added) The apparatus of claim 60, wherein x is about 0.55 and y is about 0.45 along a first surface of said sensing member and x is about 0.75 and y is about 0.25 along a second surface of said sensing member opposite said first surface.

65. (Added) The apparatus of claim 2, wherein said sensing member is comprised of an oxygen deficient ionic oxide material.

66. (Added) The apparatus of claim 65 wherein the said sensing member is comprised of a YSZ material.

67. (Added) The combination of claim 48, wherein said peak magnitude is in a range of about 1 volt per μm to about 1000 volts per μm.

68. (Added) The combination of claim 67, wherein said peak magnitude is in a range of about 10 volts per μm to about 100 volts per μm.

69. (Added) The combination of claim 48 wherein said sensing member is comprised of a ferroelectric material.

70. (Added) The combination of claim 48, wherein said sensing member is comprised of a PZT material.

71. (Added) The combination of claim 48, wherein the system is operable to detect oxygen concentration at a temperature below about 400K.